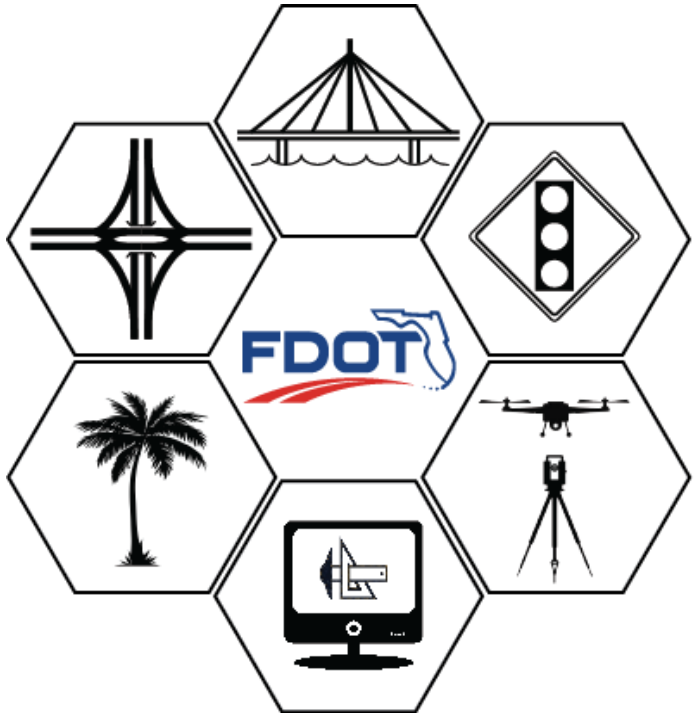


FDOT TRANSPORTATION SYMPOSIUM 2019

Pavement Management

Wiley Cunagin, PE, PhD and Kyle Kroodsma

What is Pavement Management?

- It is a management approach used by personnel to make cost-effective decisions about a road network.

AASHTO Pavement Management Guide (2001)

- A **Pavement Management System** is a set of tools or methods that assist decision-makers in finding optimum strategies for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time.

AASHTO Guide for Design of Pavement Structures (1993)

What is Pavement Management?

Plain Language Version

The **Right** pavement in the **Right** place at the **Right** time.

- When
- Which roadways
- What treatment
- How much money
- System-wide planning

To make these decisions, we must first know the “why”

WHY We Resurface Roads

- Long-Range Objective – Preserve the State Highway System (SHS).
- Short-Range Objective – Through the Tentative Work Program, ensure that 80% of pavement on the SHS meets Department standards.

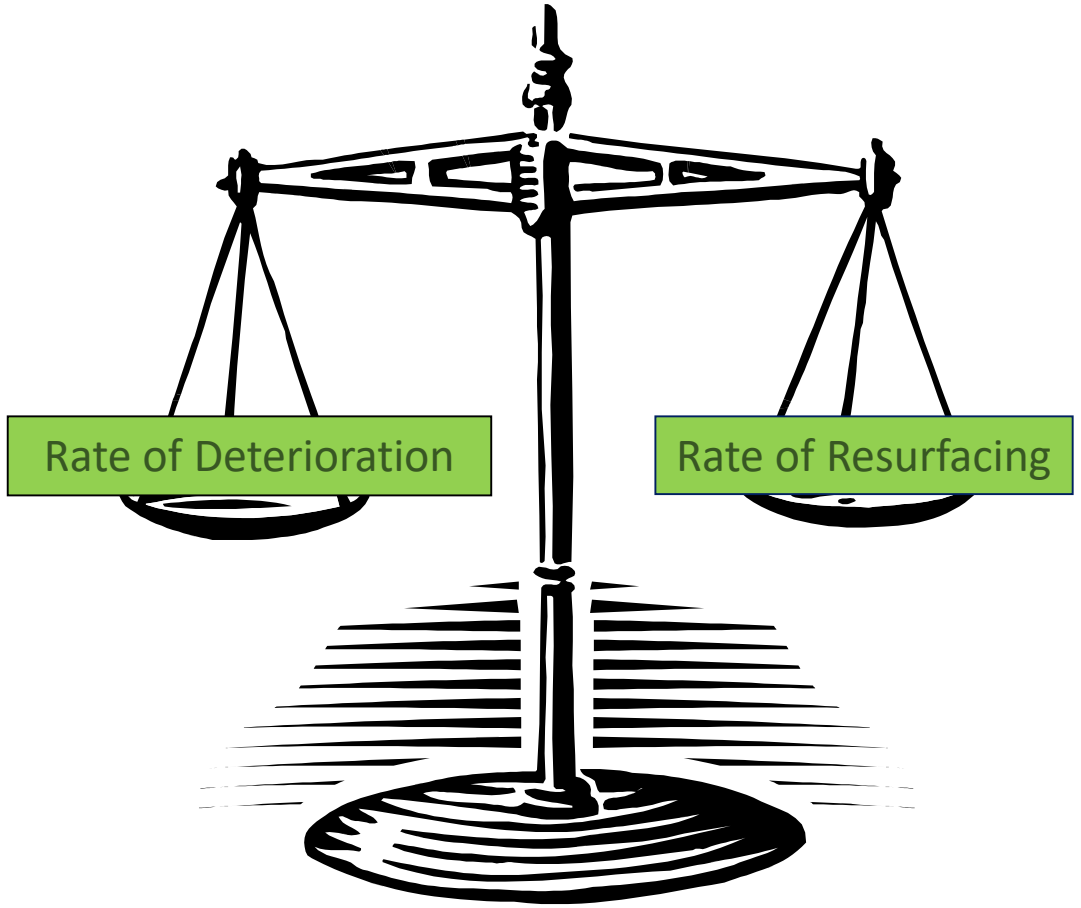
(4) At a minimum, the department's goals shall address the following prevailing principles.

(a) Preservation.—Protecting the state's transportation infrastructure investment. Preservation includes:

1. Ensuring that 80 percent of the pavement on the State Highway System meets department standards

Section 334.046, Florida Statutes

Achieved by **balancing** the rate of deterioration with the rate of resurfacing.



Projects are chosen in accordance with the following criteria:

- *Safety* – Wheelpath Rutting, Friction
- *Preservation of the system* – Cracking, Delamination, Potholes, Spalling, Raveling, Patching, Depressions
- *Ride* – Rippling, Faulting, Utilities, Public Complaints

Project Eligibility Criteria

- Projects are programmed to correct deficient sections.
- The Pavement Condition Survey (PCS) rates pavement sections on a scale of 0 (worst) to 10 (best).
  - Flexible pavements are rated for cracking (including patching and raveling), ride, and rutting.
  - Rigid pavements are rated on defect (cracking, patching, spalling, and surface deterioration) and ride.
- Pavement sections having any rating < 6.5 are classified as deficient.
  - Exception: A section with a posted speed < 50 mph and whose ride rating is between 5.5 and 6.4.

Project Eligibility Criteria

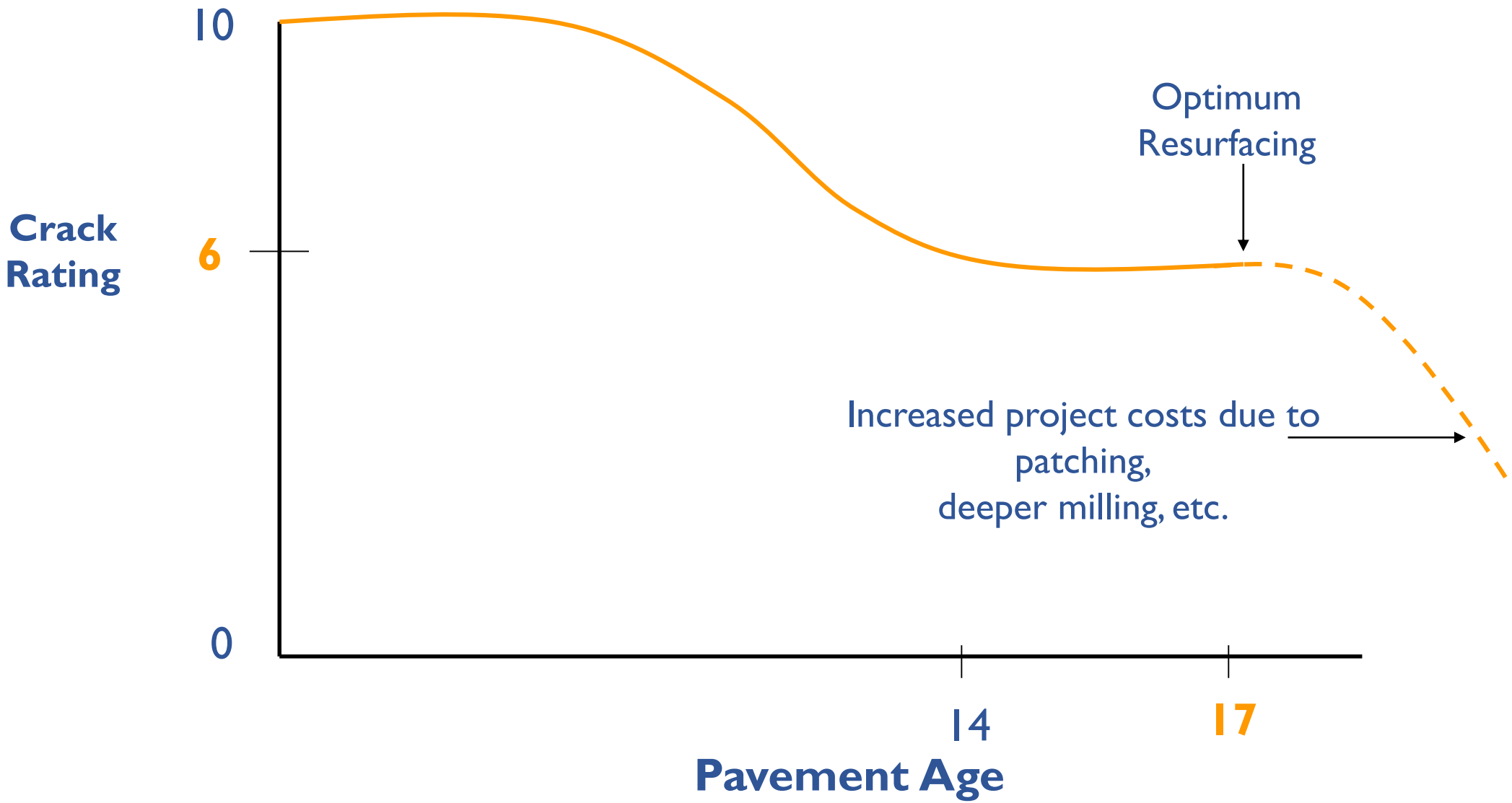
- Work Program Instructions:
  - Construction phases for pavement sections rated 7 and projected to be deficient by the year of construction may be gamed for adoption in the third year of the new five-year work program.
  - However, due to the variability in pavement deterioration rates, *it is not recommended* that construction phases be gamed for non-deficient sections in the last two years of the work program.

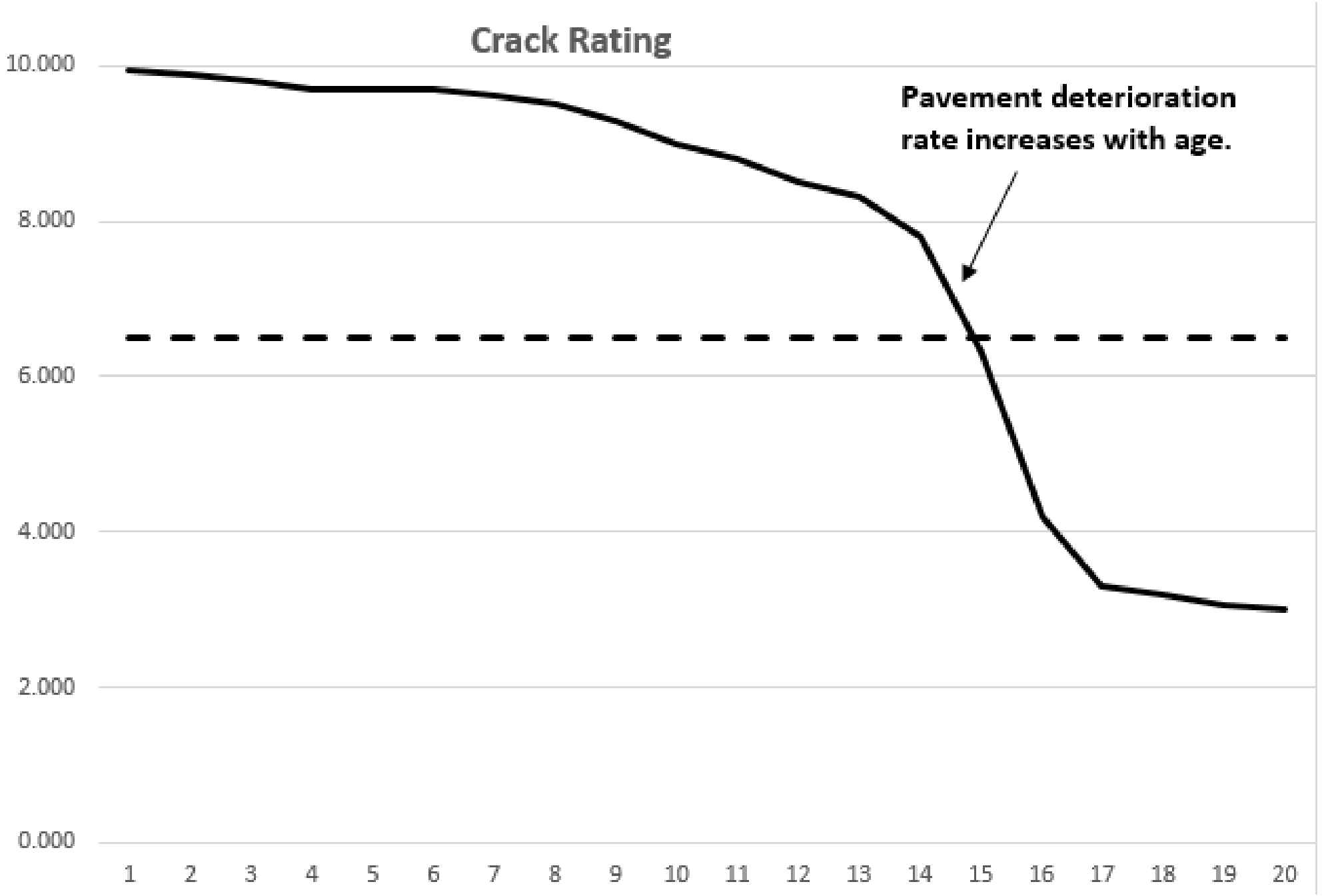
WHEN to Resurface

- New resurfacing projects are programmed for the new 3rd year of the five-year work program.
- Pavement condition deterioration typically accelerates with time.
- In order to resurface pavements at the *optimum time*, they need to have been identified, gamed in the work program, and designed prior to reaching that critical stage.

This is based on the theoretical textbook Optimum Time for Resurfacing curve.

Graph Showing Typical Optimum Time for Resurfacing




Crack Rating
10.000
8.000
6.000
4.000
2.000
0.000
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Pavement deterioration rate increases with age.

WHICH Roadways?

- Complicated process involving many factors:
  - Pavement Condition Ratings
  - Type(s) of Distress
  - Location
  - Age
  - Surface Type
  - AADT
  - Truck Volume
  - Maintenance Issues
- Ultimately, the decision to rehabilitate a roadway section comes down to **engineering judgment**, based on the available information and experience.

WHICH Roadways?

Pavement Condition Ratings

- Good starting point
  - Easily identify deficient roadways
  - Easily identify good performers
  - Allows initial screening
    - Definitely needs to be resurfaced
    - Maybe needs to be resurfaced
    - Definitely does not need to be resurfaced

- Not nuanced enough for complete picture, however.
- Sorting through the “maybes” requires other analysis.

WHICH Roadways?

Type(s) of Distress

- Cracking
  - Most common distress (≈90% of 2019 deficient lane mileage shows a deficient crack rating)
  - Allows infiltration of water into pavement structure
  - Left untreated, can lead to reconstruction
- Ride Quality
  - Forms public opinion despite much lower occurrence than cracking (≈11% of 2019 deficient lane mileage)
  - Poor ride leads to higher user costs in the form of vehicle maintenance
- Wheelpath Rutting
  - Most critical concern but least prevalent distress (≈2.5% of 2019 deficient lane mileage)
  - Safety issue at higher speeds

WHICH Roadways?

Other Factors

- Location
  - South Florida pavements generally deteriorate at a slower rate than those in North Florida.
    - Surface proximity of limerock
    - Soil variability
    - Construction methods
  - Presence of muck or other unsuitable embankment material.

WHICH Roadways?

Other Factors

- Age
  - Average non-deficient life for FDOT pavements is ≈ 13.6 years.
  - Average age at resurfacing is ≈ 16.1 years.
  - Older pavements are more likely to experience a sudden, dramatic decrease in functionality than new pavements.

- Surface Type
  - Dense-graded average age is ≈ 14.3 years (Survival age ≈ 18.9 years).
  - Open-graded average age is ≈ 12.7 years (Survival age ≈ 13.5 years).
    - More susceptible to raveling
    - More likely to have rim marks from large trucks

WHICH Roadways?

Other Factors

- AADT
  - Increases the costs and benefits of resurfacing.
  - Delays associated with resurfacing (lane closures).
  - Higher construction cost with higher AADT.
  - Benefits of resurfacing reach a larger number of people.

- Truck Volume
  - Trucks contribute about **95**% of all damage done to roadways.
  - Higher truck volume tends to increase the rate of pavement deterioration.

WHICH Roadways?

Other Factors

- Maintenance Issues
  - Recurring roadway patches
  - Depressions at cross drains
  - Standing water during heavy rains

WHICH Roadways?

Finding Information

- Pavement Management Infonet
  - Numerous reports to provide necessary information.
  - Includes data from PCS, RCI, Work Program, Construction, and Core Reports.
  - Prepared reports issued in printer-friendly formats (PDF).
    - Also available on FDOT.gov
  - Interactive Online reports allow specific, user-defined parameters.

http://infonet.dot.state.fl.us/PavementManagement/

Pavement Condition Survey Report

(Performance Information)

Pavement Condition Survey

For Alachua County

Other Conditions: Critical Value=6.4

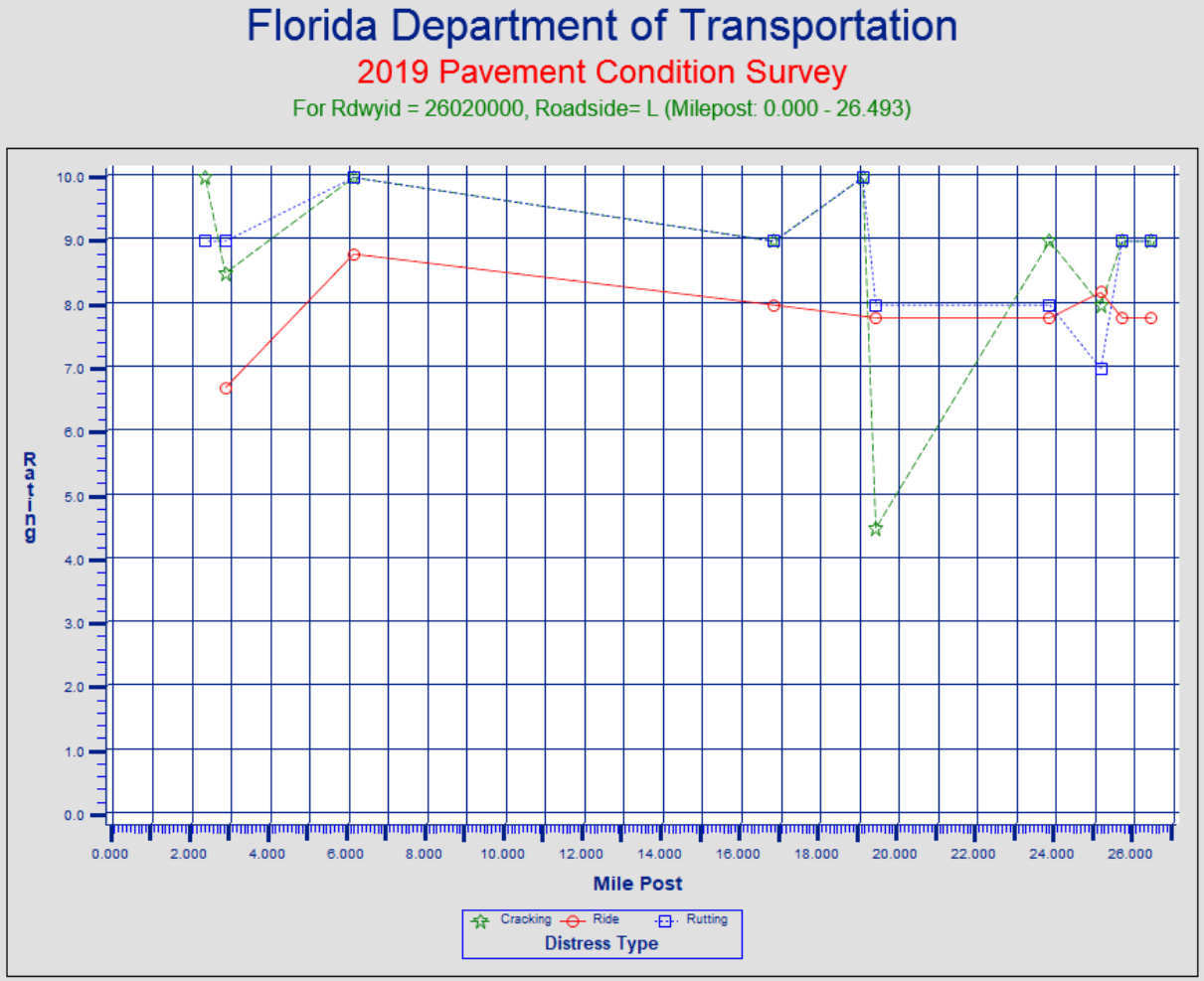
Click on the Begin Mile Point to plot the history and forecast years of crack, ride and rut ratings distribution for a roadway segment.

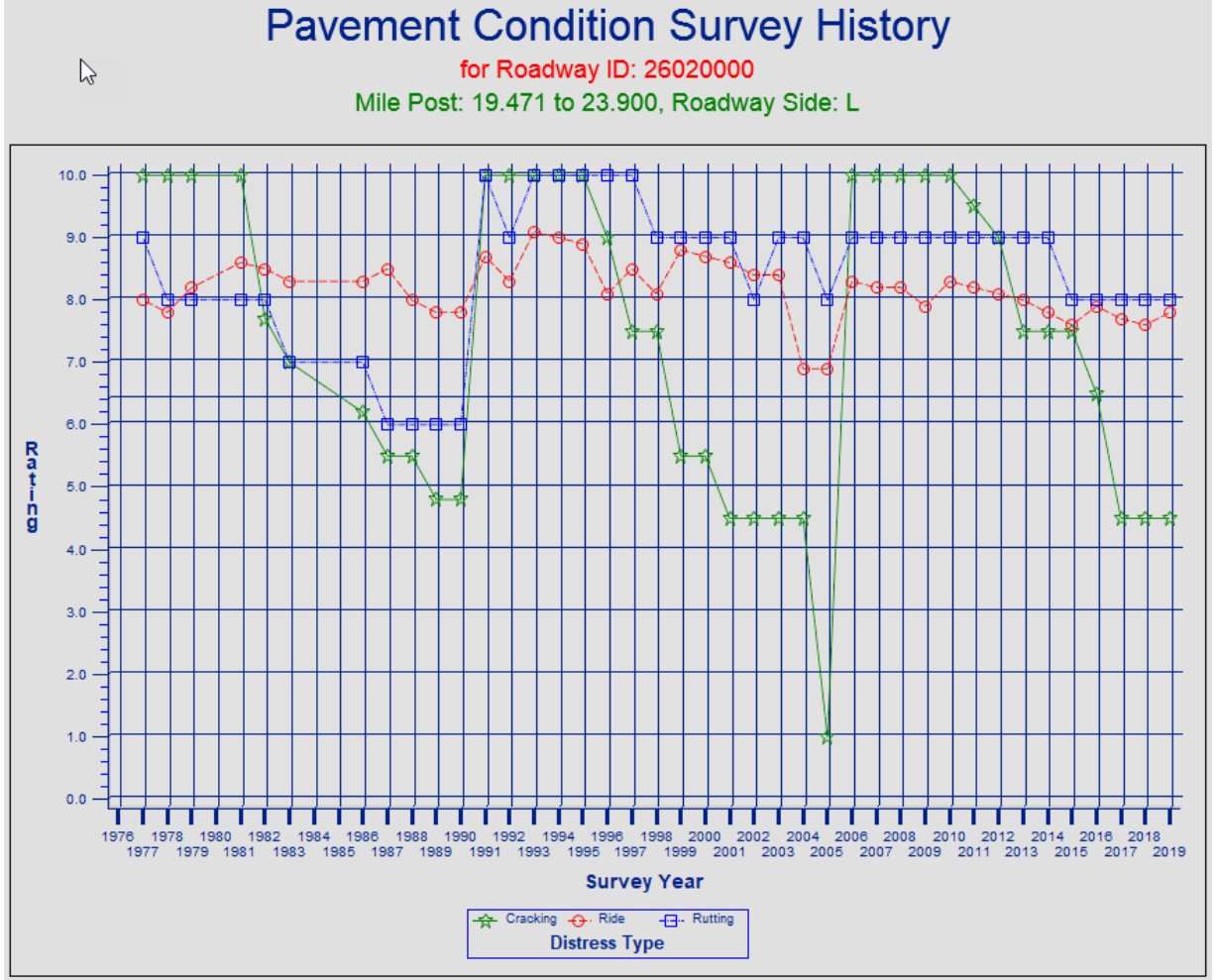
Click on the Roadway ID to plot the current year of crack, ride and rut ratings distribution for an entire roadway.

Roadway Segment									Tentatively Planned Project						PCS Survey Information								
Roadway ID # (Section Graph)	SR	US	Begin Mile Point (History Link)	End Mile Point (Link Multi Proj)	Rdwy Side	Posted Speed	AADT	% Trucks	Item Segment	Begin Mile Point	End Mile Point	Rdwy Side	Fiscal Year	Work Mix	Current Pvmt Age In Yrs	% of Cover	Cracking 2019	Ride 2019	Rutting 2019	Lane Miles	Video Log	GIS Map	F.A.S.T. Plot
26020000	20	441	16.884	19.140	R	45	24500	4.60							11		8.0	8.0	9.0	4.512	Picture	Map View	FASTPLT
26020000	20	441	19.140	19.471	L	45	29500	4.60							2		10.0		10.0	0.662	Picture	Map View	FASTPLT
26020000	20	441	19.140	19.471	R	45	29500	4.60							2		10.0		10.0	0.662	Picture	Map View	FASTPLT
26020000	20	441	19.471	23.900	L	65	23000	4.60	4361731	19.685	26.424	C	2018	0012	14	95%	4.5	7.8	8.0	8.858	Picture	Map View	FASTPLT
26020000	20	441	19.471	23.900	R	65	23000	4.60	4361731	19.685	26.424	C	2018	0012	14	95%	4.5	7.6	8.0	8.858	Picture	Map View	FASTPLT
26020000	25	441	23.900	25.200	L	45	9300	4.60	4361731	19.685	26.424	C	2018	0012	14	100%	9.0	7.8	8.0	2.600	Picture	Map View	FASTPLT
26020000	25	441	23.900	25.200	R	45	9300	4.60	4361731	19.685	26.424	C	2018	0012	14	100%	8.5	7.9	8.0	2.523	Picture	Map View	FASTPLT
26020000	25	41	25.200	25.744	L	45	12500	4.60	4361731	19.685	26.424	C	2018	0012	14	100%	8.0	8.2	7.0	0.608	Picture	Map View	FASTPLT
26020000	25	41	25.200	25.744	R	45	12500	4.60	4361731	19.685	26.424	C	2018	0012	14	100%	8.5	7.9	8.0	0.544	Picture	Map View	FASTPLT
26020000	25	41	25.744	26.493	C	55	7700	4.60	4361731	19.685	26.424	C	2018	0012	14	91%	9.0	7.8	9.0	1.498	Picture	Map View	FASTPLT
26020064	20	27	0.000	1.188	C	35	10500	7.10							2		10.0	7.8	9.0	2.376	Picture	Map View	FASTPLT
26030000	45	27	0.000	13.080	C	60	3982	13.80							14		7.5	7.6	8.0	26.160	Picture	Map View	FASTPLT
26030000	45	27	13.080	13.530	C	40	3982	13.80							16		8.5	7.5	8.0	0.900	Picture	Map View	FASTPLT
26030000	45	27	13.530	14.206	L	40	6700	6.60							20		8.5	7.6	9.0	1.313	Picture	Map View	FASTPLT
26030000	45	27	13.530	14.206	R	40	6700	6.60							20		8.5	7.0	10.0	1.246	Picture	Map View	FASTPLT
26030000	45	27	14.206	14.718	C	60	6700	6.60							20		9.5	7.3	8.0	1.024	Picture	Map View	FASTPLT

FDOT TRANSPORTATION SYMPOSIUM

- Roadway ID #
- Begin Mile Post





- Item Segment takes you to the Work Program group's Item Segment Lookup for the selected project.
- FAST Plot takes you to a plot similar to the Begin Mile Post one above but also shows the projected ratings for the current work program's fifth year.

Overlap Report

(Miscellaneous Information)

FLORIDA DEPARTMENT OF TRANSPORTATION

All system pavement improvement project overlap

fm wpa tentative plan -- 2017 - 2024, extracted on 05/24/19

Location			Second Project					First Project					
DISTRICT	CONTYDOT	RDWYID	Roadway Side	Begin Mile Post	End Mile Post	Finproj- Fiscal Yr 2- Work Mix	Overlap Years Apart	Finproj- Fiscal Yr 1- Work Mix	Roadway Side	Begin Mile Post	End Mile Post	Number of Projects	Overlap Distance
1	CHARLOTTE	01010000	C	13.25	14.16	44152415203-2022-0012	0	44026815801-2022-0012	L	12.489	13.369	2	0.119
1	CHARLOTTE	01050000	C	9.145	11.183	44151715202-2022-0012	2	43942515202-2020-0012	C	6.371	9.26	2	0.115
1	COLLIER	03050000	C	0	4.022	43084815201-2023-0213	3	43084915202-2020-0213	C	3.826	7.045	2	0.196
1	HARDEE	06010000	C	11.013	11.264	43658615201-2018-0012	1	42063335201-2017-0213	C	9.938	11.049	2	0.036
1	HENDRY	07010000	C	22.489	28.854	40828665201-2017-0213	0	40828655201-2017-0213	C	17.614	22.887	2	0.398
1	MANATEE	13040000	C	3.243	6.975	44504415202-2023-0012	1	44068815201-2022-0221	C	3.256	5.398	2	2.142
1	POLK	16130000	C	2.914	6.245	44448415201-2022-0012	3	43802415806-2019-0012	C	2.914	4.9	2	
1	POLK	16470000	C	18.024	21.978	43801815201-2020-0213	0	43801835201-2020-0012	R	17.202	24.38	2	3.954
1	OKEECHOBEE	91020000	C	22.251	31.696	43806315201-2019-0012	2	43494015201-2017-0012	C	16.888	22.266	2	0.015
2	BRADFORD	28020000	C	11.622	22.169	43617915201-2019-0012	2	43231415201-2017-0012	C	10.095	11.814	2	0.192
2	GILCHRIST	31030000	C	2.746	12.747	43911615201-2020-0012	1	43762015201-2019-0012	C	0	2.758	2	0.012
2	SUWANNEE	37010000	C	14.628	26.152	44328315201-2022-0012	3	43429615201-2019-0012	C	6.261	15.036	2	0.408
2	TAYLOR	38010000	C	7.809	24.844	44105915201-2021-0012	2	43761815201-2019-0012	C	0	7.831	2	0.022
2	TAYLOR	38010000	C	7.809	24.844	44105915201-2021-0012	3	43616515201-2018-0012	C	24.832	27.395	2	0.012
2	NASSAU	74040000	C	16.053	22.183	44126015201-2022-0012	3	43761215201-2019-0012	C	15.294	16.086	2	0.033
2	ST. JOHNS	78080000	C	25.514	34.855	42402645201-2024-0213	1	42293885202-2023-0002	C	28.809	30.173	2	1.364
3	BAY	46000000	C	0	1.757	41098185201-2021-0002	2	42446455201-2019-0213	C	0	3.447	2	1.757
3	BAY	46140000	I	5.63	7.053	21787545801-2018-0213	1	21787535201-2017-0213	C	4.305	5.631	2	0.001

The Overlap year turns RED when it is 3 years or less , and The Overlap distance turns RED when it is 0.5 mile or more.

- Shows all overlaps between currently adopted and/or gamed projects.

FDOT TRANSPORTATION SYMPOSIUM

Prepared Reports

(Miscellaneous Information)

09:20 Monday, May 6, 2019

FLORIDA DEPARTMENT OF TRANSPORTATION

ALL SYSTEM PAVEMENT CONDITION FORECAST

PAVEMENT IMPROVEMENT PROJECTS IN FM WPA TENTATIVE PLAN -- 2019 - 2024, EXTRACTED ON 05/03/2019

SORT BY RDWYID MILEPOST R ASCENDING L DESCENDING

DISTRICT = 2 COUNTY = ALACHUA

RDWYID / SR / INTERSECT AT (MP|SIDE) / ITMSEG-P / CONTRACTOR (AGE_ONE YEAR) / ITMSEG-F	BMP / G_BMP / W_BMP	EMP / G_EMP / W_EMP	RW / LN / RW	SYS / %T / SURFTYPE	TYP / AADT / ASTYPE	SPD / WKMX-P / WKMX-F	DISTRESS RATINGS	SURVEYED YEAR 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	FUTURE
								2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2024 (REG)
26003000	0.000	2.544	C	1	1	40	CRACKING	10.0	10.0	10.0	9.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	
120			4	3.4	14100		RIDE	8.9	8.9	7.7	7.6	8.3	7.8	7.4	7.3	7.2	7.5	7.2	7.0	6.8	
SR 25(0.0C)					FC	25R															
							CRACKING	6.5	4.5*	4.5*	4.5*	4.5*	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
				(2012)			RIDE	6.3	6.1	6.4	6.1	6.2	7.8	7.7	7.3	7.6	7.2	7.3	7.6	7.3	7.0

- Published monthly.

Prepared Reports

(Miscellaneous Information)

09:20 Monday, May 6, 2019

FLORID ...RTATION

AL ...CAST

PAVEMENT IMPROVEMENT ...24, EXTRACTED ON 05/03/2019

...ING

```
26010000    0.000 11.639  R    1    1  65
25    441                  2  4.6   15000
SE 183 PL( 0.2R)                    FC5M
2078498     0.000 11.462  C 2007     0012
V. E. WHITEHURST & SONS, I(2008)
4361571     0.000 11.639  C 2021     0012
```

---------- ---------- DISTRICT = 2 COUNTY = ALACHUA ----------

```
RDWYID        BMP     EMP RW SYS TYP SPD
 SR    US    G_BMP   G_EMP LN   %T   AADT
INTERSECT AT (MP|SIDE)          SURFTYPE
ITMSEG-P    W_BMP   W_EMP RW FY-P WKMX-P
CONTRACTOR (AGE_ONE YEAR)        ASTYPE
ITMSEG-F    W_BMP   W_EMP RW FY-F WKMX-F


26003000    0.000   2.544  C    1    1  40
120                        4  3.4   14100
SR 25( 0.0C)                      FC125R

                          (2012)
```

- Published monthly.

Prepared Reports

(Miscellaneous Information)

09:20 Monday, May 6, 2019

CRACKING	10.0	10.0	10.0	10.0	10.0	8.0	7.5	7.5	7.5	4.5*	4.5*	4.5*	3.5*	
RIDE	9.1	8.2	7.9	8.1	8.0	8.7	8.6	8.5	8.5	8.0	7.4	7.0	6.7	
CRACKING	1.0*	10.0	10.0	10.0	10.0	10.0	9.5	9.5	8.0	8.0	6.5	4.5*	4.5*	2.8
RIDE	6.1*	8.1	8.1	8.2	8.2	8.1	7.9	7.8	7.5	8.1	7.9	7.7	7.8	7.5

DISTRICT = 2 COUNTY = ALA

DISTRESS RATINGS	SURVEYED YEAR 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	FUTURE
========														
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2024 (REG)
CRACKING	10.0	10.0	10.0	9.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	
RIDE	8.9	8.9	7.7	7.6	8.3	7.8	7.4	7.3	7.2	7.5	7.2	7.0	6.8	
CRACKING	6.5	4.5*	4.5*	4.5*	4.5*	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
RIDE	6.3	6.1	6.4	6.1	6.2	7.8	7.7	7.3	7.6	7.2	7.3	7.6	7.3	7.0

- Published monthly.
- Historical and future data shown (last 25 years as well as forecasted future fifth-year value, either from simple regression or FAST regression).

FDOT TRANSPORTATION SYMPOSIUM

WHICH Roadways?

Engineering Judgment

- Field Review
  - Single-most important factor.
  - Don’t let numbers cloud good judgement.
  - Video Log is outdated and not adequate.
  - Walk alongside the roadway at various points to see what is happening.
  - Many distresses are not visible from the cab of a vehicle traveling at speed but can be easily spotted from the roadway shoulder.
    - Aerial imagery has the same limitations and is not recommended
  - Experience leads to knowledge about how certain distresses are likely to worsen over time, and which ones are most critical.

Typical Top-Down Fatigue Cracking

Beginning of Crack Spalling (typically after 3 years deficient)

Severe Spalling with Extensive Patching (waiting too long to fix)

Patching operations are expensive and inconvenient to the public

WHAT Treatment?

- Overlaps with Pavement Design.

- Depends on the distress:
  - Thin mill and overlay is typically used to treat surface distresses
  - Deeper mill and overlay may be needed to address deeper cracking or unstable pavement layers that are causing rutting
  - Reconstruction used in areas where the causes of pavement distress are deep within the pavement structure, including base and subgrade layers

WHAT Treatment?

- Alternative Treatments:
  - Often applicable to a very specific set of conditions.
  - FDOT has and continues to study a variety of different treatments.
    - Hot-in-Place recycling
    - Bonded friction course
    - Microsurfacing
    - Crack sealing
    - Crack relief layers
  - Can generally be constructed cheaper than conventional methods.
  - Generally have a limited life-cycle compared to standard mill & replace rehabilitation, although some treatments may provide a longer life but have other drawbacks.

HOW MUCH MONEY?

FAST – Florida's Analysis System for Targets

- Statewide Resurfacing $$ = Cost of keeping SHS at 80% non-deficient.
- Prior to 2009, approximately 5.3% of statewide lane miles, distributed based on current deficiencies.
  - Fairly consistent target year-to-year.
- 2008 Resurfacing Task Team → FAST
  - More detailed forecasts allow for analysis of many different funding scenarios
  - Between FY2010 and FY2022, approximately 10,000 lane miles were or are planned to be taken out of the work program for a reduction of approximately $3 billion.
  - Lane miles now distributed based on expected deficiencies in new fifth year.

What does FAST provide?

- The ability to calculate future resurfacing allocations based on forecasted conditions.
- Impact analysis for different funding scenarios and policy decisions.
- Prioritized list of candidate resurfacing projects (available upon request)
  - Annual QA process includes comparison of each District's Resurfacing Monitor programmed list to the FAST-selected candidate project list, but Districts maintain the freedom to choose what projects to program and when.
- Improved section-level condition forecasts of the SHS.

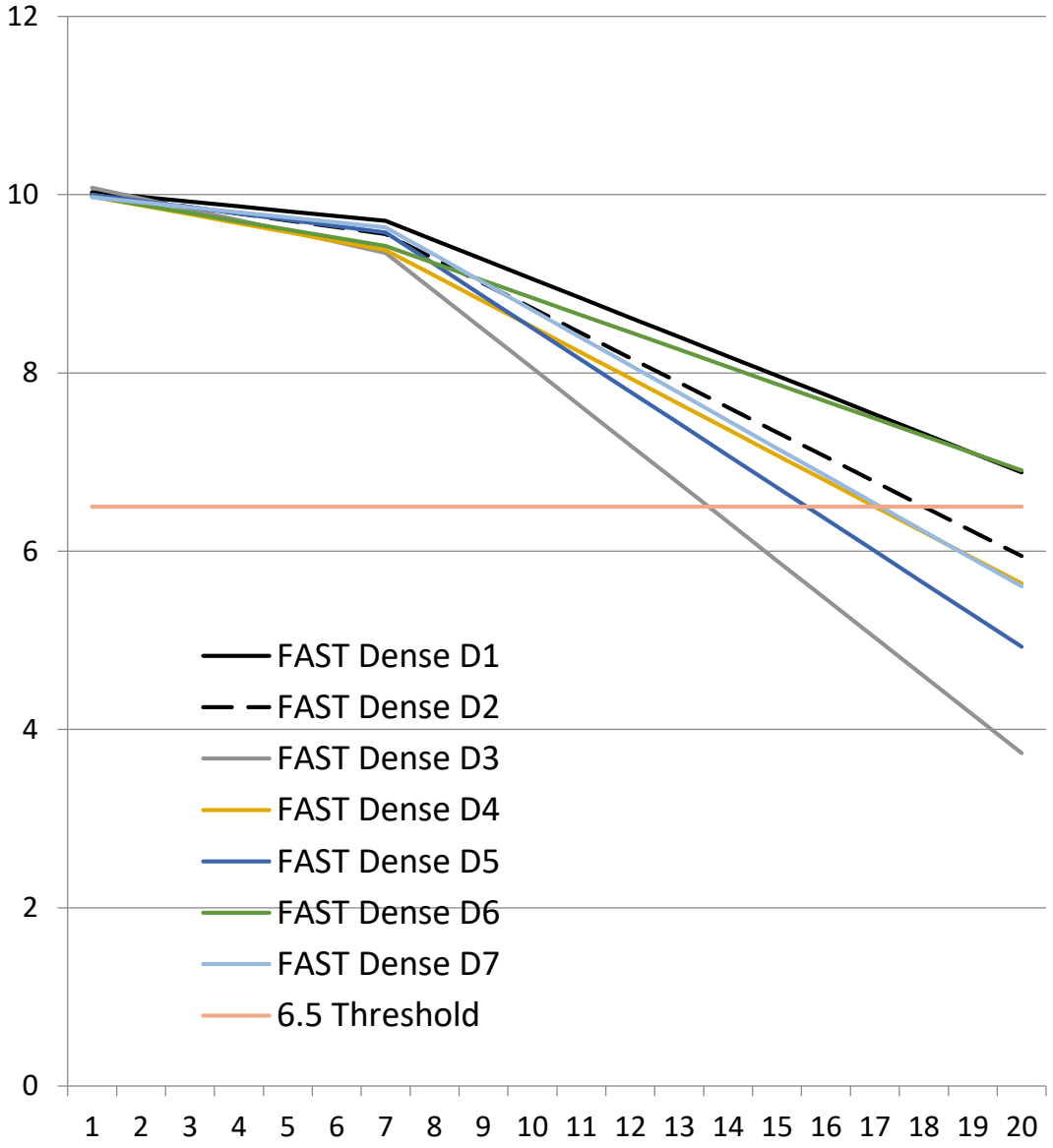
Why do we use FAST to predict future pavement conditions?

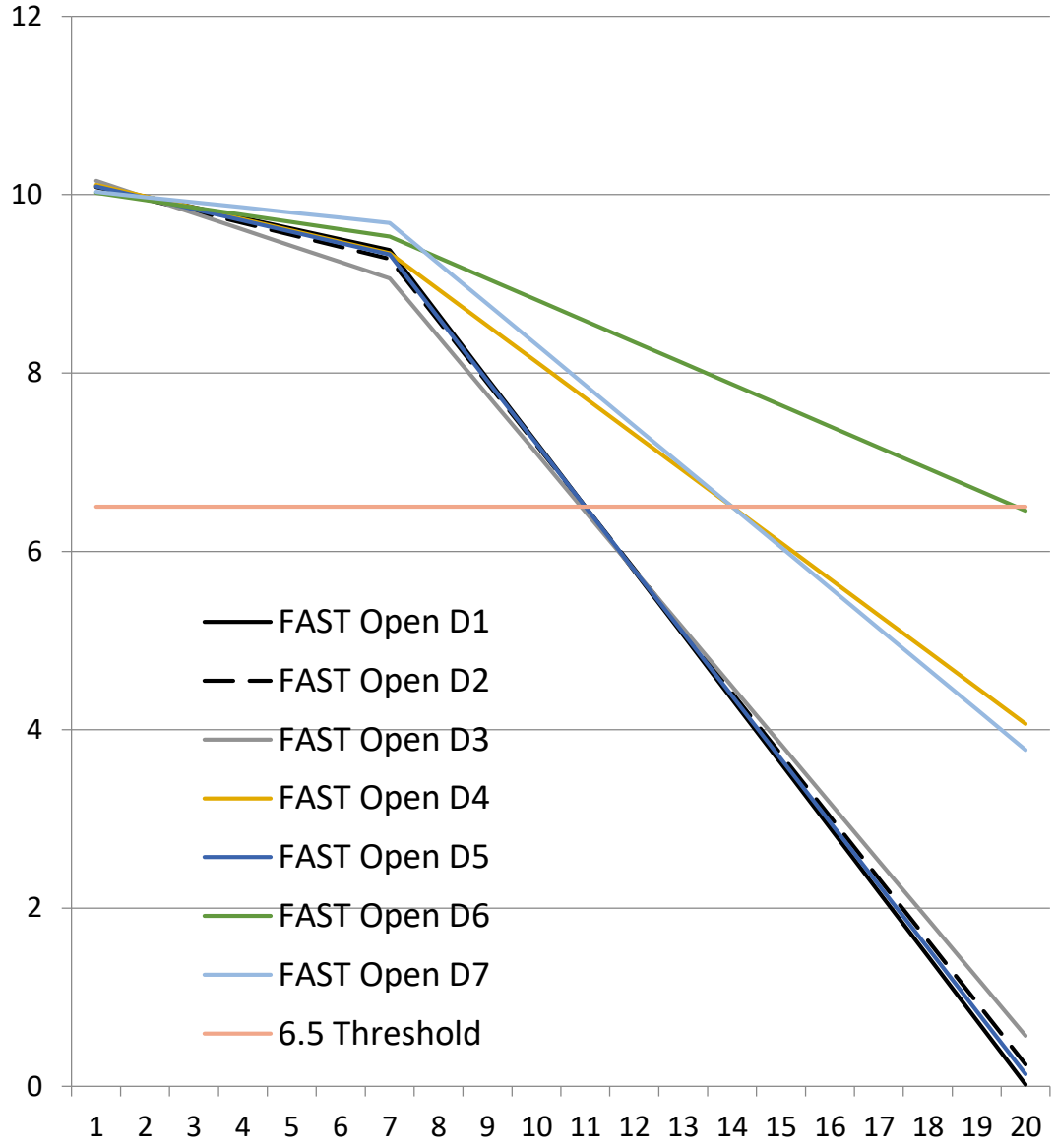
- Previous Department policy was to set targets for the new outer year of the work Program based on the most recent PCS data.
- Future targets were distributed to each District based on their proportion of the total deficient lane miles in the current year.
- FAST allows the resurfacing lane miles to be allocated using the predicted deficiencies for the new outer year of the Work Program.

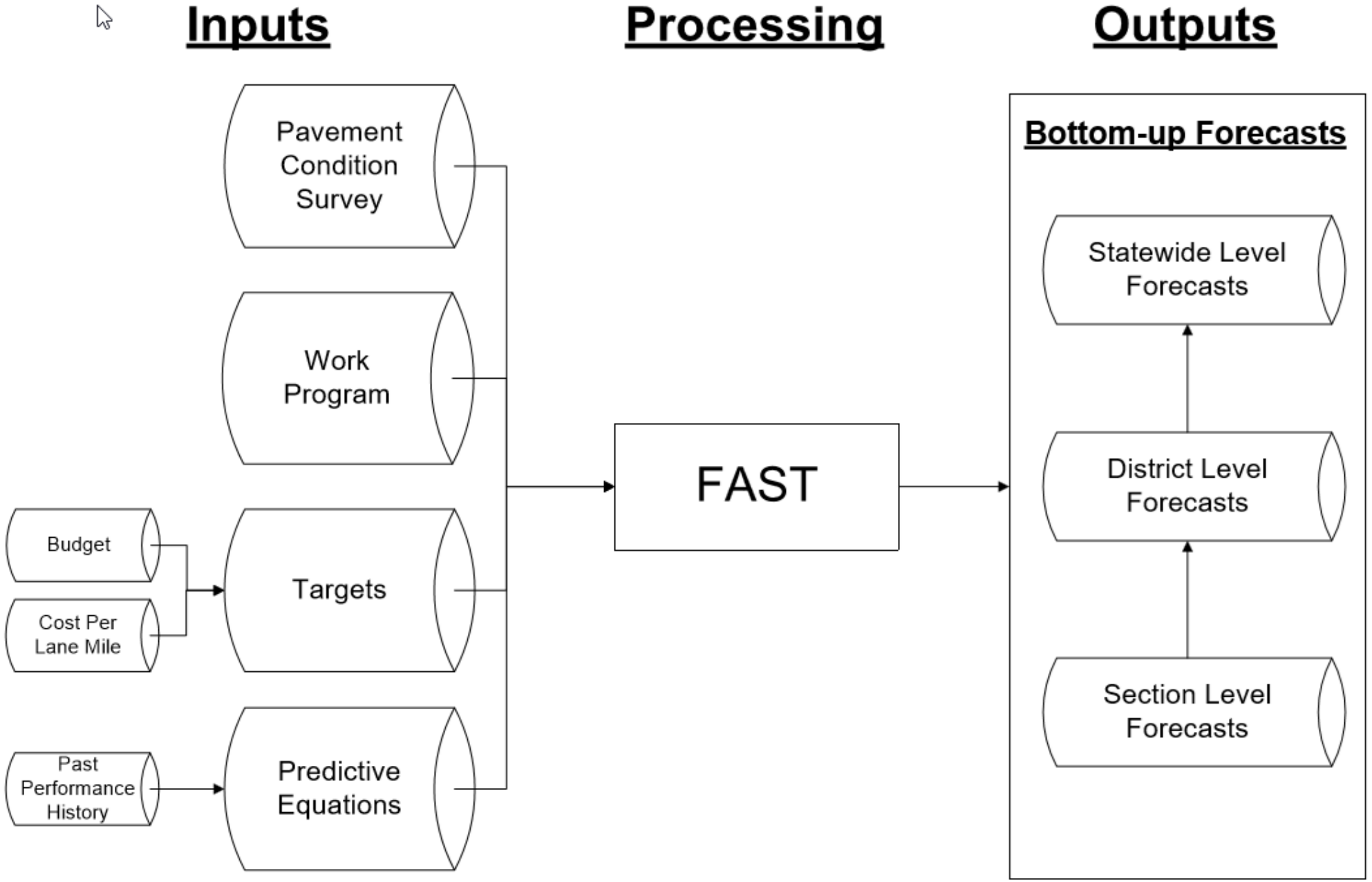
How does FAST predict future pavement conditions?

- Piece-wise linear regression equations based on the historical performance of pavements *in each District* as well as *pavement type (open- or dense-graded)* are used to predict the performance of relevant pavements.
  - Most recent five years used to calibrate slope of line segments (coefficients)
  - Iterative process in which the predicted deficient lane miles for each cohort and statewide total is compared to the observed deficient lane miles for the current year and each coefficient is adjusted up or down to better improve the prediction (2014 PCS data used to calibrate 2019 coefficients)

Example Plot of Predicted Crack Rating versus Age by District for Dense-Graded and Open-Graded Pavements






Inputs
Processing
Outputs
Pavement Condition Survey
Work Program
Budget
Cost Per Lane Mile
Targets
Past Performance History
Predictive Equations
FAST
Bottom-up Forecasts
Statewide Level Forecasts
District Level Forecasts
Section Level Forecasts

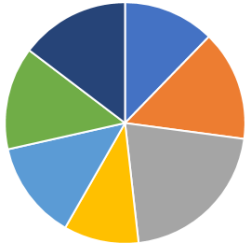
Dollar Distribution

- Total dollars available set by policy – attempts to balance deterioration vs. rehabilitation: 80%.

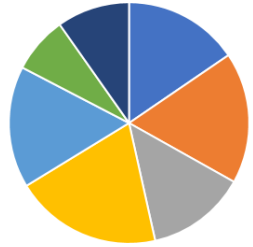
vs

- Distribution amongst Districts: based on total projected percentage of projected statewide deficiencies, by District. Work Program adjusts distribution each of the following two years.

5th Year



4th Year



3rd Year

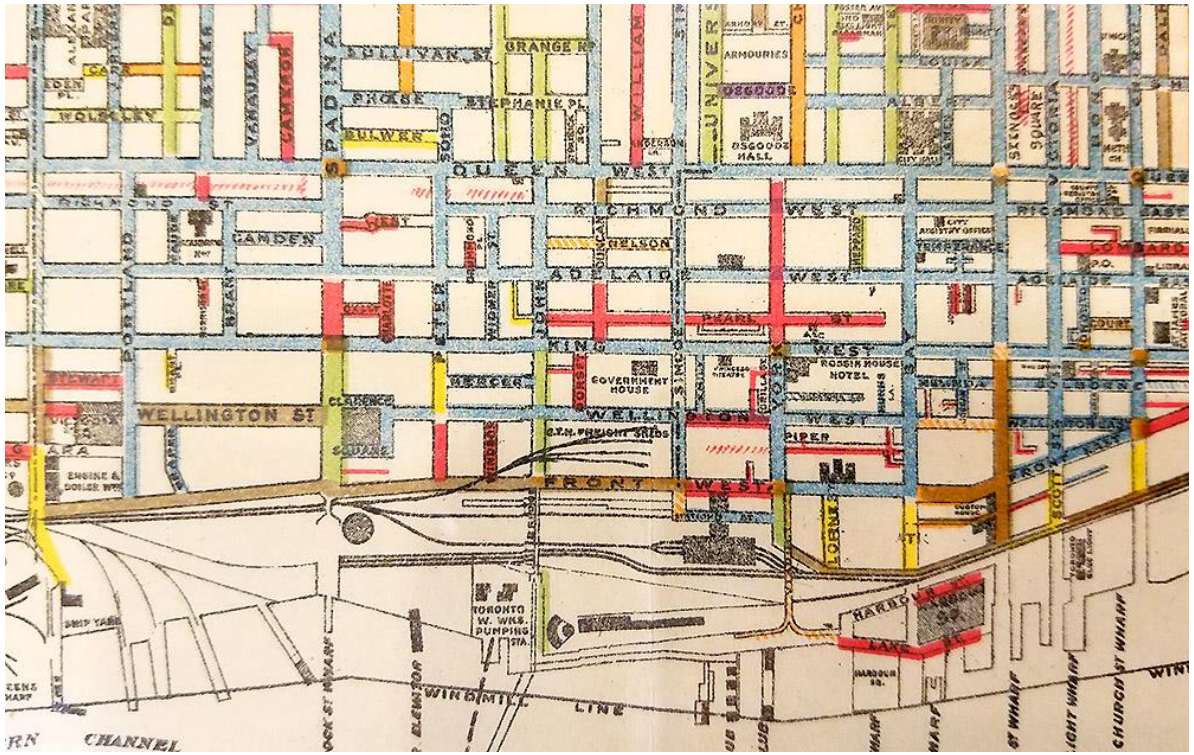
FAST Limitations

- Accurate on a system-wide level.
- Section-level projections are less accurate.
  - Better than pre-FAST section-level projections
  - Use historical performance data of other similar roadways
  - Not accurate enough to rely solely upon for project programming purposes

STATEWIDE SYSTEM PLANNING

Project Development

- Pavement management deals with primarily system-level planning
- System-level planning needs to be applied at the project level
- Scope Development



Project Development

- Proper project scope:
  - Better construction/material prices by buying in bulk
  - Increases efficiency in design and construction
  - Less impact on traveling public

Project Development / Scoping

- Begin and End Project Limits
  - Best practice is to match the limits of a previously constructed project
  - Field review to ensure proposed limits make sense
  - Coordinate with other ongoing projects
  - Coordinate with other agencies
- Exceptions
  - OK to except perfectly good pavement sections out of a resurfacing project
  - Keep in mind that any exception areas will have to last until the next resurfacing of the entire roadway
  - Will require maintenance activity or stand-alone project if exception area doesn’t last until next resurfacing

FDOT TRANSPORTATION SYMPOSIUM

Project Development / Scoping

- Which Lanes?
  - Almost always resurface both all lanes of a non-divided roadway and all travel lanes in a given direction on divided roadways.
    - Preferable to resurface both directions on divided roadways if constructed at the same time and/or are within 1 to 1.5 points of each other in rating. Significant savings in MOT dollars and interruptions to the traveling public.
  - Ramps, accel/decel lanes, parking lanes, turn lanes – usually.
  - Paved shoulders, median crossovers – often, but adhering to practical design.

Project Development

- Ancillary features
  - Rest areas
  - Frontage roads
  - Cross streets / side streets
  - Inspection / Weigh stations
  - Overpass / Underpass roadways

Keep in mind that only through lanes are rated and therefore credit towards your resurfacing target is not given for ancillary features (except frontage roads), ramps, accel/decel lanes, turn lanes, and parking lanes.

Pavement Management Summary

- Good pavement management practices allow us to make good decisions about future resurfacing needs.
- Resurfacing roads that need to be resurfaced while maximizing useable life.
- Decreased cost through increased efficiency.
- Positive public perception.

Contacts

Internal: http://infonet.dot.state.fl.us/PavementManagement/

External: https://www.fdot.gov/roadway/PM/PM.shtm

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